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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/785,424	02/23/2004	Subbareddy Kanagasabapathy	51123	8584
21874	7590	11/16/2004	EXAMINER	
EDWARDS & ANGELL, LLP			LEE, SIN J	
P.O. BOX 55874				
BOSTON, MA 02205			ART UNIT	PAPER NUMBER
			1752	

DATE MAILED: 11/16/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/785,424

Applicant(s)

KANAGASABAPATHY ET AL.

Examiner

Sin J. Lee

Art Unit

1752

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 23 February 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 07-12-04 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 09072004.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

### DETAILED ACTION

1. Claim 6 is interpreted by the Examiner to mean that the photoresist does not have a detectable output of Si species at a concentration of  $1 \times 10^{12}$  molecules/cm<sup>2</sup> or greater upon the exposure to patterned activating radiation.

### Claim Rejections - 35 USC § 102

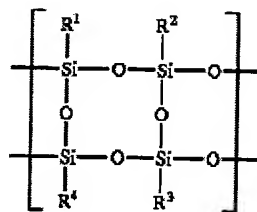
2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

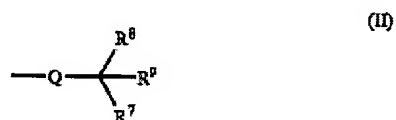
3. Claims 1-10 are rejected under 35 U.S.C. 102(e) as being anticipated by Sooriyakumaran et al (US 2002/0081520 A1).

Sooriyakumaran teaches ([0024]) a positive lithographic photoresist composition comprising a fluorocarbonol and/or fluoroacid functionalized *silsesquioxane* polymer or copolymer and a *photoacid generator*. The fluorocarbonol and/or fluoroacid functionalized silsesquioxane polymer comprise a monomer unit of the following structure (I) (see [0044]-[0045])

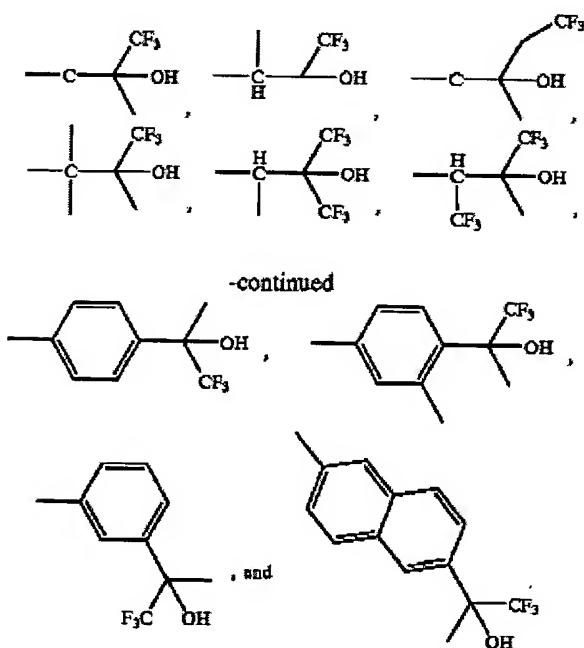


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in which  $R^1$ - $R^4$  are independently selected from the group consisting of substituents having the following structure (II)



Sooriyakumaran furthermore teaches (see [0047]) following examples for the substituents having the structure (II)

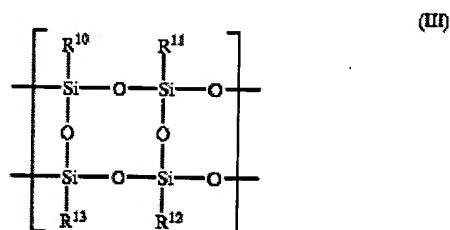


Since all of those examples contain  $CF_3$  group (a fluoroalkyl group), the prior art teaches present silsesquioxane resin which has pendant fluoroalkyl groups.

Sooriyakumaran teaches ([0048]) that the structure (I) monomer units (as shown above) may be used to form a fluorocarbonol functionalized copolymer comprising the

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structure (I) monomer units shown above and monomer units having the following structure (III)



in which at least one of  $\text{R}^{10}$ - $\text{R}^{13}$  is an *acid-cleavable moiety*.

In [0075], Sooriyakumaran teaches a process for generating a resist image on a substrate comprising the steps of: (a) coating a substrate with a film comprising his resist composition; (b) imagewise exposing the film to radiation; and (c) developing the image. Sooriyakumaran furthermore teaches ([0077]) that most preferably, UV radiation having a wavelength of 157 nm or 193 nm is used for the imagewise exposure step. Therefore, one of ordinary skill in the art would immediately envisage using 193 nm radiation for the imagewise exposure step in Sooriyakumaran. Present specification states on pg.3 "[w]e have now discovered silsesquioxane polymers, including *fluorinated silsesquioxane polymers* can exhibit reduced or no detectable (e.g., no detection at levels of  $10^{13}$  or  $10^{12}$  molecules/cm<sup>2</sup>) outgassing of Si species upon exposure to laser radiation (laser radiation being argon-fluoride (ArF, 193 nm) laser at a dose of 50 mJ/cm<sup>2</sup>). . . . We also have surprising found that such outgassing of Si species does occur with siloxane (i.e., linear *rather than a ladder silsesquioxane polymer*) and other non-silsesquioxane polymers." Therefore, it is the Examiner's position that exposing Sooriyakumaran's photoresist (to 193 nm radiation) would

*inherently* not result in a detectable output of Si species at a concentration of  $1 \times 10^{13}$  or  $10^{12}$  molecules/cm<sup>2</sup> or greater as presently recited in claims 1, 6, and 8 because Sooriyakumaran's polymer is a ladder silsesquioxane polymer which contains pendant fluoroalkyl groups. Thus, the prior art teaches present inventions of claims 1-4, 6, 8, and 9.

With respect to present claims 5 and 10, Sooriyakumaran teaches ([0075]) that the substrate may or may not be coated with an organic anti-reflective layer prior to deposition of the resist composition. Based on this teaching, one of ordinary skill in the art would immediately envisage coating the substrate with an organic anti-reflective layer before depositing Sooriyakumaran's photoresist composition. Therefore, the prior art teaches present invention of claims 5 and 10.

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sooriyakumaran et al (US 2002/0081520 A1).

Sooriyakumaran teaches ([0076]) that after the resist composition is coated onto the substrate, the resist film is heated to an elevated temperature of 90-160°C for about 1 minute before the imagewise exposure step. Also, in [0078], Sooriyakumaran teaches that after the photoresist composition is exposed to radiation, the photoresist is again

heated to an elevated temperature for a short period of time before the development step. Based on Sooriyakumaran's teaching, it would have been obvious to one of ordinary skill in the art to pre-heat Sooriyakumaran's resist film at the temperature of 120°C for 1 minute before the imagewise exposure step with a reasonable expectation of obtaining a resist image. Besides, since the present temperature of 120°C overlaps with the prior art's range of 90-160°C, the prior art's teaching renders present temperature of claim 7 *prima facie* obvious. In the case "where the [claimed] ranges overlap or lie inside ranges disclosed by the prior art," a *prima facie* case of obviousness would exist which may be overcome by a showing of unexpected results, In re Wertheim, 541 F.2d 257, 191 USPQ 90 (CCPA 1976). Therefore, Sooriyakumaran's teaching would render obvious present invention of claim 7.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sin J. Lee whose telephone number is 571-272-1333. The examiner can normally be reached on Monday-Friday from 9:00 am EST to 5:30 pm EST.

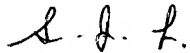
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cynthia Kelly, can be reached on 571-272-1526. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only.

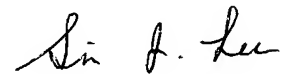
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For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



S. Lee  
November 12, 2004



Sin J. Lee  
Patent Examiner  
Technology Center 1700